In re Patent Application of:
ROSSIN ET AL.
Serial No. **09/518, 421**
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<u>In the Claims:</u>

Please amend the claims as follows:

1. (Currently Amended) A light source, comprising:

a semiconductor laser including a laterally confining optical waveguide having a reflecting first end and a second end, the optical waveguide having a first portion of a first width extending a first distance from the first end and a second portion of a second width, less than five microns, wider than said first width and extending a second distance from the second end, and a third portion extending from said first portion to said second portion and having a width that tapers from said second width of said second portion to said first width of said first portion; ~~and~~

wherein the first portion filters lateral optical modes higher than a fundamental lateral optical mode, and an output is emitted from the second end of the optical waveguide, such that a far field beam profile of said output emitted from the second end of the optical waveguide has a peak at 0°, and a respective slope of said far field beam profile on either side of said peak has a polarity that remains constant with increase in divergence angle; <u>and</u>

<u>whereby a threshold power of the semiconductor laser, at which a first order lateral optical mode begins to oscillate, is above 400 mW.</u>

2. (original) A light source as recited in claim 1, further comprising an optical fiber having an input end, the optical fiber including a wavelength-selective reflector to provide reflectance at a wavelength of light amplified in the semiconductor laser, and a light coupling system disposed to optically couple light from the second end of the optical waveguide into the input end of the optical fiber.

3. (original) A light source as recited in claim 2, wherein the wavelength-selective reflector is a Bragg fiber grating disposed within the optical fiber.

4. (original) A light source as recited in claim 2, wherein a reflectance value of the wavelength-selective reflector and a separation distance between the second end of the optical waveguide and the wavelength-selective reflector are selected to induce coherence collapse in light output from the laser.

5. (original) A light source as recited in claim 4, wherein a separation distance between the first and second ends exceeds 1 mm.

6. (original) A light source as recited in claim 4, wherein the reflectance value of the wavelength-selective reflector is less than 10%.

7. (original) A light source as recited in claim 6, wherein

the semiconductor laser has a gain spectrum having a peak gain wavelength, the peak gain wavelength being substantially equal to a peak reflectance wavelength of the wavelength-selective reflector at a semiconductor laser temperature between 0 °C and 50 °C.

8. (original) A light source as recited in claim 4, wherein a separation distance between the second end of the optical waveguide and the wavelength-selective reflector is in the range 0.5 m to 2 m.

9. (original) A light source as recited in claim 2, wherein the wavelength-selective reflector reflects light within a selected reflection bandwidth, and light emitted by the semiconductor laser has a spectral bandwidth approximately equal to the reflection bandwidth.

10. (original) A light source as recited in claim 1, wherein the second end of the optical waveguide is provided with an anti-reflection coating.

11. (original) A light source as recited in claim 1, wherein each of the first and second waveguide portions have a substantially uniform respective width.

12. (original) A light source as recited in claim 1, wherein

the tapered portion of the optical waveguide has a length of at least 100 μm.

13. (original) A light source as recited in claim 1, wherein the laterally confining optical waveguide is formed in a planar structure.

14. (original) A light source as recited in claim 1, wherein an optical mode of the laterally confining optical waveguide is transversely asymmetric.

15. Currently Cancelled

16. (original) A light source as recited in claim 1, further comprising a temperature controller coupled to maintain the laser at a selected operating temperature.

17. (Currently Amended) A fiber optic system, comprising:

a communications fiber having a first end and a second end, the communications fiber including an excitable fiber medium; and

a pump laser coupled to supply pump light to the excitable fiber medium, the pump laser including a laterally confining optical waveguide having a first end of a first width provided with a high reflector, and a second end of a second width, the optical waveguide having a first portion of said first width and extending a first distance from the first end and a second

portion of said second width, less than five microns, and wider than said first width, and extending a second distance from the second end, and a third portion extending from said first portion to said second portion and having a width that tapers from said second width of said second portion to said first width of said first portion; ~~and~~

wherein, the first portion filters out lateral optical modes higher than a fundamental lateral optical mode, and an output is emitted from the second end of the optical waveguide, such that a far field beam profile of said output emitted from the second end of the optical waveguide has a peak at 0°, and a respective slope of said far field beam profile on either side of said peak has a polarity that remains constant with increase in divergence angle;

whereby a threshold power of the pump laser, at which a first lateral optical mode begins to oscillate, is above 400 mW.

18. (original) A system as recited in claim 17, further comprising a first optical fiber coupled to the communications fiber, and having an input end, the first optical fiber including a wavelength selective reflector providing reflectance at a wavelength of light amplified in the pump laser, and a light focusing system disposed to optically couple light from the second end of the optical waveguide into the input end of the first optical fiber.

19. (original) A system as recited in claim 18, wherein the wavelength selective reflector includes a fiber Bragg grating disposed within the first optical fiber.

20. (original) A system as recited in claim 18, wherein the wavelength selective reflector includes a second optical fiber optically coupled to the first optical fiber between the pump laser and the communications fiber, a fiber Bragg grating being disposed within the second optical fiber.

21. (original) A system as recited in claim 18, wherein a reflectance value of the wavelength selective reflector and a separation distance between the second end of the optical waveguide and the wavelength selective reflector are selected to induce coherence collapse in light output from the laser.

22. (currently amended) A system as recited in claim 17, wherein the excitable fiber medium is a rare-earth doped fiber amplifier <u>or a rare-earth doped fiber laser</u>.

23. Currently Cancelled

24. (original) A system as recited in claim 17, wherein light output from the pump laser induces Raman gain in the excitable fiber medium.

25. (currently amended) A system as recited in claim 24, wherein the excitable fiber medium is a fiber Raman amplifier <u>or a fiber Raman resonator</u>.

26. Currently Cancelled

27. (original) A system as recited in claim 17, further comprising an optical transmitter coupled at a first end of the communications fiber to transmit optical signals along the communications fiber.

28. (original) A system as recited in claim 17, further comprising an optical receiver coupled to receive optical signals at a second end of the communications fiber.

29. (original) A system as recited in claim 17, further comprising a controller coupled to the pump laser to control operation of the pump laser.

30. (original) A system as recited in claim 29, wherein the controller includes a power supply coupled to the pump laser to provide current to the pump laser.

31. (original) A system as recited in claim 29, wherein the controller includes a temperature controller coupled to the pump laser to control a temperature of the pump laser.

32. (previously added) The light source according to claim 1, wherein said first width is on the order of 2.3 microns and said second width is on the order of 4.3 microns.

33. (previously added) The system according to claim 17, wherein said first width is on the order of 2.3 microns and said second width is on the order of 4.3 microns.

34. (currently added) The light source according to claim 1, whereby the threshold power is above 1000 mW.

35. (currently added) The system according to claim 17, whereby the threshold power is above 1000 mW.

36. (Currently Added) A light source, comprising:

a semiconductor laser including a laterally confining optical waveguide having a reflecting first end and a second end, the optical waveguide having a first portion of a first width extending a first distance from the first end and a second portion of a second width, less than five microns, wider than said first width and extending a second distance from the second end, and a third portion extending from said first portion to said second portion and having a width that tapers from said second width of said second portion to said first width of said first portion;

wherein the first portion filters lateral optical modes higher than a fundamental lateral optical mode, and an output is emitted from the second end of the optical waveguide, such that a far field beam profile of said output emitted from the second

end of the optical waveguide has a peak at 0°, and a respective slope of said far field beam profile on either side of said peak has a polarity that remains constant with increase in divergence angle; and

whereby output power of the semiconductor laser monotonically increases with injection current to the semiconductor laser for output power up to 700 mW.